

A group of eight people, likely engineers or inspectors, are standing in a field. They are all wearing white hard hats and high-visibility orange and yellow safety vests. They are looking towards a wooded area in the background. The scene appears to be a construction or erosion control site.

Erosion and Sediment Control Process Review Final Report

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I. Executive Summary

The purpose of this process review was to evaluate the quality of the Maryland State Highway Administration's (SHA) process for ensuring that erosion and sediment controls are designed, constructed, and maintained in accordance with the established standards and specifications.

The review consisted of evaluating four construction projects within SHA Districts, 3, 4, and 5. Three projects were conventional (design-bid-build) construction projects and one was a design-build project. File reviews and field inspections were completed for each project. The file review included reviewing documents and files along with discussions with the construction staff including the Project Engineer, Quality Assurance Inspector, Environmental Monitor, SHA Erosion and Sediment Inspector, and others. The field reviews consisted of inspecting the erosion and sediment control devices along the project.

Although each project had issues specific to the site conditions, many observations were similar for each review. It was noted that every project reviewed needed erosion and sediment control modifications. Erosion and sediment controls are only designed to reflect initial and final phases of grading so the controls were not adequate to handle every intermediate site condition. The modifications were also necessary due to weather conditions, change in scope such as MOT or other constraints. One major recommendation that is proposed to deal with the need for modifications is to have redundant controls around sensitive environmental resources, which could be specified in the Invitation for Bid (IFB). Also, it is recommended that the field office staff including the contractor facilitate an interim erosion and sediment plan meeting to review construction stages.

A few best practices have also been highlighted in this report based on feedback of successful practices used on these projects. Several additional recommendations have been made in an attempt to deal with the issues observed as discussed later in the report.

II. Introduction

A. Background:

According to 23 CFR 650.203, all highway projects funded in whole or in part under Title 23, United States Code, must be designed, constructed and maintained in accordance with standards that will minimize erosion and sediment damage to the highway and adjacent properties. The Federal Highway Administration (FHWA) adopted the American Association of State Highway Transportation Officials (AASHTO) “Highway Drainage Guidelines, Volume III, *Erosion and Sediment Control in Highway Construction*” as guidelines to be followed on all construction projects funded under Title 23. It is expected that each State Highway agency apply these same guidelines or develop guidelines more stringent.

B. FHWA’s Oversight Responsibilities:

As directed in 23 CFR 650.203:

It is the policy of the Federal Highway Administration (FHWA) that all highways funded in whole or in part under title 23, United States Code, shall be located, designed, constructed and operated according to standards that will minimize erosion and sediment damage to the highway and adjacent properties and abate pollution of surface and ground water resources.

As part of FHWA’s oversight responsibilities, FHWA has the responsibility to ensure that all reasonable steps shall be taken to insure that highway projects, which design for the control of erosion and sedimentation and the protection of water quality, comply with applicable standards and regulations of other agencies (23 CFR 650.207(b)).

Additionally, projects that are considered federal actions through the use of Federal funds or Federal permits and approvals must comply with the National Environmental Policy Act (NEPA). NEPA requires all federal agencies, as well as implementing agencies, to consider the impacts of their actions on human, natural, and cultural resources. Consideration of these impacts also means that measure necessary to mitigate adverse impacts be incorporated into the “action” or project. Fulfillment of mitigation commitments is a condition of receiving Location Approval from FHWA, which allows SHA to use Federal-aid funds to advance a project from planning into design, right-of-way acquisition, and construction (23 CFR 771.109(b)). Controls to avoid or reduce erosion and sedimentation are considered a commitment in the NEPA document and therefore, must be designed, constructed and maintained in accordance with approved plan.

C. Purpose and Objectives:

The purpose of this review was to evaluate the quality of the Maryland State Highway Administration's process for ensuring that erosion and sediment controls are designed, constructed and maintained in accordance with the established standards and specifications. Four objectives for this review, as outlined in the work plan, include: 1) evaluate SHA's current process and determine the need for improvement; 2) investigate compliance with erosion and sediment control plans on several conventional and design-build projects currently in construction; 3) showcase best practices currently in place; and 4) establish a baseline for future comparison with new initiatives that have been developed to improve the process but are not yet in place.

D. Review Approach:

In April of 2005 an interagency team convened to discuss conducting a process review of the environmental permitting process. Initially, the review was to be focused on erosion and sediment control process and its impact on wetland permitting; and while the review did include review of wetland permit modifications, the main focus remained on the erosion and sediment control process. The team comprised of representatives from the FHWA, SHA, Maryland Department of Environment, and the U.S. Army Corps of Engineers. The core work team included¹:

Ingrid Allen, FHWA, Area Engineer
Caryn Brookman, FHWA, Environmental Protection Specialist
David Beaulieu, SHA, Office of Construction
Lisa Choplin, SHA, Office of Highway Development
Steve Elinsky, U.S. Army Corps of Engineers
George Fish, SHA, Office of Construction
Elder Ghigiarelli, Maryland Department of Environment
Azmat Hussain, FHWA, Area Engineer
Heather Lowe, SHA Project Planning Division
Karuna Pujara, SHA, Highway Hydraulics Division
Susie Ridenour, SHA, Environmental Programs Division
Polly Solliday, SHA, Highway Hydraulics Division
Jim Tracy, Maryland Department of Environment
Paul Wettlaufer, U.S. Army Corps of Engineers
John Zanetti, SHA, Office of Highway Development

A work plan was drafted by the team that contained the following elements: purpose of the review, objectives, resources to be used, and procedures of the review (**Attachment 1**).

¹ Several other participants from the Environmental Programs Division and Office of Construction were involved in specific project reviews.

Initially, the focus of the review was on design-build projects. However, after the first team meeting it was decided that the review would focus on both types of projects due to the similarity in process between them. One design-build project and three conventional (design-bid-build) projects were reviewed at different stages of construction, from 15% complete to about 85% complete. This was intentional so the team could review temporary and permanent erosion and sediment controls at different stages of construction.

The file reviews included open discussions with the construction and District staff including, Project Engineer, Quality Assurance Inspector, Environmental Monitor, SHA Erosion and Sediment Inspector, and in some cases, Assistant District Engineer for Construction. During the file review, inspection reports from the Quality Assurance Inspector, Erosion and Sediment Control Manager (ESCM-contractor hired), MDE Inspector, Environmental Monitor and when applicable the SHA Erosion and Sediment Inspector were randomly reviewed. Additionally, for each project the letter demonstrating that the contractor-hired Erosion and Sediment Control Manager had received the MDE training was reviewed.

The field reviews consisted of reviewing erosion and sediment control devices in place. The controls in place were compared to the approved erosion and sediment control plans.

E. SHA's Current Process

The E&S plan review process is governed by the "Maryland Erosion & Sediment Control Guidelines for State and Federal Projects".² These guidelines were established to provide state and Federal agencies with the information necessary for submittal of erosion and sediment control plans for construction projects to MDE for review and approval. The provisions of these guidelines are pursuant to the Environmental Article, Title 4, Subtitle 1, Annotated Code of Maryland and COMAR 26.17.01.

SHA's Highway Hydraulics Division (HHD) reviews all erosion and sediment control plans prior to sending to MDE for review. HHD typically reviews E&S plans around the semi-final/final review stage; although a cursory review of the preliminary plans is completed around the Preliminary Investigation stage for right-of-way needs. Plans typically go through several iterations between SHA and MDE before final approval. MDE has final approval authority.

E&S plan review is essentially the same for conventional and design-build projects. For both types of projects, SHA reviews the plan prior to submitting

² Maryland Erosion & Sediment Control Guidelines for State and Federal Projects", Published January 1990, Revised January 2004. Maryland Department of Environment

the plan to MDE for final approval. Construction cannot begin until the plan has been approved by MDE. SHA holds the permit for E&S and stormwater management. Since the design-build team develops the plan as opposed to SHA, the HHD can require additional controls above the minimum standard, especially if sensitive environmental resources are present in the project area. These requirements are written as specifications in the Invitation for Bid (IFB). The HHD can also make “recommendations” for additional or different controls if there is an existing environmental condition off site that would affect the performance of the controls. These “recommendations” are written but are not required.

According to specification 308.03.03, the contractor-hired Erosion and Sediment Control Manager must complete daily inspections of E&S controls. Independent Environmental Monitors, SHA E&S inspectors, and/or the Project Engineer may also complete daily inspections, when applicable to a particular project. Quality Assurance Inspectors should inspect projects once every two weeks at a minimum or more frequently when issues arise. MDE should inspect projects as frequently as needed to ensure that the approved erosion and sediment control plans are on site and complied with, that every site with a plan is inspected for compliance with that plan, and to notify the on-site personnel/owner in writing when violations are observed (*Maryland Erosion and Sediment Control Guidelines for State and Federal Projects, Section 7.0²*)

All modifications to the erosion and sediment control plan need to be approved by MDE. The SHA Project Engineer has acceptance authority for SHA on needed modifications; however, the HHD typically reviews large modifications for acceptability. All modifications must be approved by MDE. MDE field inspectors, as per SHA-MDE Memorandum of Understanding (MOU), approve minor modifications (**Attachment 2**). Major modifications are reviewed and approved by MDE’s Plan Review Division. The Quality Assurance Inspector and the MDE Inspector have the responsibility to review the controls in the field to determine the need for modifications. SHA, MDE, or the Contractor can initiate modifications.

Once construction is completed, MDE is required to inspect the site to ensure stabilization as per the *Maryland Erosion and Sediment Control Guidelines for State and Federal Projects, Section 7.0²*

III. Observations:

A. File/Field Reviews:

The team conducted four file/field reviews:

US 29 at Blackburn Road (Montgomery County)-June 13 and 14, 2005

MD 5/Hughesville (Charles County)-June 29, 2005

MD 43 (Baltimore County)-July 7, 2005

US 29 at Blackburn Road (Montgomery County):

This interchange project is part of the larger US 29 project. At the time of review this project was approximately 80% complete. The estimated date of completion is September 2005. US 29 is a design-build project; however, design was taken close to final design prior to handing it over to the design-build team. As a result of erosion and sediment issues due to the above normal rainfall in 2003, an Environmental Monitor was placed on the project. This Environmental Monitor also served dual duty as the Quality Assurance Inspector.

According to the QA inspection reports and discussion with the project team, there were many instances of “non-compliance” (“D” ratings) during initial construction, even though the project team never received a MDE citation. This was due to the above normal rainfall in 2003 and the controls not being designed to handle the inputs. The Environmental Monitor was brought on board to help correct the issues. Although the project was built per plan and to standard, the design proved inadequate to handle the above normal rainfall. This caused the need for many erosion and sediment control modifications including one major modification.



Once the Environmental Monitor came on board, a “team approach” was developed which involved daily to almost daily inspections by the Project Engineer, ESCM and QA Inspector/Environmental Monitor. This team would identify issues and methods for correction while out in the field. Each person would write separate inspection reports; however, the reports would be similar since consensus was reached in the field. Weekly erosion and sediment control field meetings would also take place with the Superintendent. This “team approach” practice is not typical but seemed to benefit this design-build project, as the project did not fall into non-compliance after the team approach was implemented.

On this project the MDE Inspector reports go immediately to the Contractor and to the Erosion and Sediment Control team for follow up. Although the QA Inspector completes no formal follow up report to the MDE Inspector’s report, the Environmental Monitor does complete a separate report, which indicates whether action items are completed. The action items include the date that maintenance was completed. The report itself is dated; making it is easy to see how quickly action items are followed up on. The overall rating for this project is a “B”.

In general, the E&S control devices inspected were found to be in good condition. All side slopes inspected were properly stabilized.

There were a few major observations noted on the US 29 project. First, although the erosion and sediment controls were built per plan and standard, the design was grossly inadequate to deal with the excessive rainfall. This resulted in modifications to all of the controls. This extra work will have to be paid through force account at the end of the job. Additionally, the Project Engineer was not immediately receiving the most up-to-date approved set of E&S plans and therefore, was not aware of modifications which resulted in the project was being constructed out of sequence. Also, Basin #5 required extensive modifications due to extremely steep slopes and excessive rainfall. According to the Environmental Monitor, the ideal scenario, if right-of-way were not limited, would have been to construct a temporary sediment trap. For Headwall 501, the plan originally called for two temporary gabion outlet structures. These structures were not able to handle the input due to the excessive rain as well as an increase in disturbed area and therefore, failed. Had SHA known during design that they owned a parcel of land immediately adjacent to the headwall, a sediment trap could have been installed at the onset of the project. Instead this was discovered *after* the temporary gabion outlet structures failed.

Best Practices:

A team approach to deal with erosion and sediment control was used on this project which required clearly defining and discussing each members roles, responsibilities, authority, and procedures for dealing with E&S controls. The team on this project consisted of the Project Engineer, the Superintendent, QA Inspector/Environmental Monitor, and the ESCM. This team approach was especially important for this project since it was a design-build project.

MD 5/Hughesville Bypass (Charles County):

This project includes the construction of a bypass around Hughesville in Charles County. Due to the nature of the project and site conditions, this project was a large earthmoving project. Construction began in October 2004 and at the time of inspection the project was approximately 15-20% complete. This project had an Independent Environmental Monitor as a condition of the wetland permit approved by the Army Corps of Engineers.

During initial construction, at the clearing and grubbing stage, there were several issues that resulted in two SHA self-imposed shutdowns as a result of the QA inspections. The shutdowns suspended the grading operations allowing time for the Contractor to put the proper controls in place. The main issue on this job, which caused the self imposed shutdowns stemmed from a lack of communication between the Contractor and subcontractor responsible for completing the clearing and grubbing. The first Contractor was replaced shortly after the project began.



Since the self imposed shut downs in January 2005, the construction team began daily erosion and sediment control meetings with the ESCM, Superintendent, Project Engineer, SHA's E&S Inspector and Environmental Monitor. According to the Project Engineer, the construction staff was increased to help deal with the erosion and sediment issues.

Five erosion and sediment control sites were visited during the field review. Each control device needed modifications. At visual inspection, all control devices were properly in place and slope stabilization had occurred with the modifications made.

MD 43 (Baltimore County):

This project consists of construction of a roadway on new alignment which will extend MD 43 into eastern Baltimore County. Construction started in July of 2003 and was approximately 60% completed during the time of review. This project does not have an Independent Environmental Monitor.

The erosion and sediment control inspectors on this project include a SHA E&S Inspector, QA Inspector and the contractor-hired ESCM. The SHA E&S Inspector reviews the project jointly with the ESCM and the QA Inspector. The QA Inspector meets with the ESCM twice a month to discuss the E&S Control Plan. The SHA E&S Inspector inspects the project daily but reports are only written once a week or after a rain event. The QA Inspector inspects the project weekly and a written report is filed.

This project has had a total of three SHA self-imposed citations as a result of QA inspections ("D" ratings) with fines totaling \$3,000. The citations were given for grading operations, silt fence installation, and not properly maintaining swales. Grading operations were shut down for 1-2 days. No MDE citations have been given. A total of eight wetland/waterway permit modifications have been given for this project. According to the construction staff, most of the modifications have been due to unforeseen circumstances, i.e. weather or site related conditions. One major issue, which required a permit modification and coordination with the resource agencies, occurred at a location where the Contractor did not have enough room to complete work. The work went out of the limits of disturbance and the fill was stock piled in an adjacent wetland. The Contractor did not get approval prior to completing this work. Orange safety fencing, a permit requirement, was not marked on the plans or in the field to demarcate the wetland.

The Team reviewed eight sites in the field. It should be noted that the ESCM was present during the field review and stabilization was occurring during the review. Some clean up such as removal of dirt piles and earth stabilization has been made as a part of the punch list and still needs to be completed. By visual inspection, the controls seemed to be working well. The overall rating of this project is a "B".



Several major observations were made on this project. First, the Contractor was given permission to grade the entire project at one time and only establish temporary stabilization instead of constructing by phase or within specified grading unit and putting in permanent controls after each phase was completed. According to field staff, there was not enough erosion and sediment control staff to deal with inspection and maintenance of the temporary controls since this project was a very large project on new alignment. Secondly, according to the construction staff, MDE compliance was not responsive to requests for approval of modifications. According to the staff, it could take several weeks for MDE compliance to respond to a needed modification. It should be noted that MDE's last inspection report was dated four months prior to our review. Lastly, similar to the other projects reviewed, the design was not adequate, as almost every control needed modifications in construction.

Best Practices:

The Project Engineer copies the Environmental Manager from the Environmental Programs Division on every modification to determine the need for a wetland/waterway permit modification.

MD 468 (Anne Arundel County):

This project consists of minor widening to provide wider lanes and shoulders due to safety concerns along the roadway. Currently the road has narrow lanes and minimal to no shoulders. Construction commenced in October 2004. However, utility relocation work, which was included under the same wetland permit as the roadwork, began in May 2004. This project has an Independent Environmental Monitor as a condition of the wetland permit.

The erosion and sediment control inspectors for this project consist of a QA Inspector, the contractor-hired ESCM, the Independent Environmental Monitor and either the Project Engineer or the Assistant Project Engineer. The Environmental Monitor completes daily reports, which are shared with the PE and Contractor. The QA Inspector typically reviews the project once every two weeks or when issues arise. The project has not received a rating less than a "C". A few ratings of "C's" were given due to lack of quick response from the Contractor to rectify the ditches taking up water due to the high water table. According to the construction staff, MDE has been very responsive to modification requests.



Three wetland permit modifications have been needed on this project. The first permit modification was a major modification, which required extensive coordination with the resource agencies. This modification was due to the utility relocation. Although the wetland was delineated on the plans and out in the field, a 22,000 sq ft area of the forested wetland was clear-cut by the utility company. The Environmental Monitor completed a drive-by of the utility work, which was how the issue came to light. The other permit modifications were minor.

Due to the extremely high water table, the erosion and sediment control and stormwater management have been difficult to construct per plan. Many modifications have been needed because of this. According to the construction staff, the MDE Inspector is very experienced and has been very responsive to needed modification approvals. The team reviewed four sites in the field including a wetland mitigation site. One of the teams observations was that there was not adequate right-of-way to construct the ditches per plan. Instead the ditches were constructed with steeper slopes in an attempt to stay within SHA's right-of-way which may have compromised safety on the project.

Best Practices:

The Environmental Programs Division helped the Environmental Monitor develop a database of report forms in an effort to standardize the reporting. Also, according to the Project Engineer, the Environmental Monitor has been very helpful on this project especially due to the environmental site conditions, i.e. high water table. Also, according to the construction staff, the Project Engineer has been very open with communication, which has helped reduce delays.

IV. Discussion and Recommendations:

The following are the major observations and subsequent recommendations as suggested by the Team. Although some of the observations are specific to a particular project, there was general consensus among the Team that the issues are more widespread and therefore, recommendations should be carried forward.

- According to field staff on the MD 43 project, MDE compliance section was not responsive to modification requests. It was also noted on the MD 5 and MD 43 projects that MDE compliance did not complete monthly inspections, in some cases there were months between inspections. US 29, MD 5 and MD 43 projects all received "non-compliance" ratings of "D" or "F" based on the QA inspection reports and required self imposed shutdowns; however, no MDE citations were given on any these projects. **Recommendation: If this problem is deemed more widespread then SHA should consider supplementing MDE Compliance staff through the use of consultants for highway construction projects. In order for this recommendation to be useful, the consultants must have delegated approval authority so decisions can be made immediately. This will take extensive coordination and agreement between the two Agencies.** Note: On the MD 468 project, the office staff stated that the MDE Inspector was very experienced and had been very responsive to needed modification approvals.
- On the MD 43 project the Contractor was given permission to grade entire project and only establish temporary stabilization instead of constructing one grading unit (20 acres) and putting in permanent controls. **Recommendation: If it is approved that grading operations can take place on more than one grading unit at once, then it is recommended that additional SHA staff be put in place to ensure controls are installed correctly and maintained until permanent**

controls are installed, *on an as needed basis*. This is especially important on larger construction jobs.

- For the US 29 design-build project, the E&S plan was designed and built per standard but the design proved inadequate to deal with the excessive rainfall. Since design build is bid lump sum, the contractor should pay the cost overrun; however, this practice may not be consistent on all design build project.
Recommendation: To ensure a balanced distribution of risk between SHA and the contractor and to maintain the contractor's stake in producing an environmentally successful project, the design build team should be encouraged to design above the minimum or assume the risk of having to pay for additional controls. This can be done by SHA being consistent with its policy not to pay the contractor for additional controls on design bid or design build projects.
- Almost all of the controls inspected during the reviews required modifications. In most cases, the E&S control pay items have been overrun due to maintenance costs. Most modifications will have to be paid through force account at the end of the job. **Recommendation:** Maryland standards for E&S controls require design for the initial phase of construction (clearing and grubbing) and for the final phase of ultimate grading. To help reduce the need for modifications, it is recommended that interim (between the initial and final phases) E&S plan meetings be held to review the construction stages and to plan any needed changes to the controls, on an as needed basis. The field office staff and the contractor should facilitate these meetings. Also, redundant controls around sensitive environmental resources should also be required in the Invitation for Bid (IFB) to compensate for any unforeseen circumstances, such as weather or site conditions.
- For the US 29 design-build project, the PE was not receiving the most up-to-date set of plans immediately and was not made aware of modifications so the project was being constructed out of sequence with final plans. SHA's current practice is to send the updated plan with approved modifications directly to the Contractor and to the SHA District Office for distribution to the Project Engineer. Sending the approved plan to the Project Engineer *through* the District Office causes delay. **Recommendation:** The E&S approved design modifications should be sent to the field office and contractor concurrently by SHA's lead office. This can be a requirement in the IFB.
- During the project reviews it was noted that on three out of the four projects there was not enough right-of-way to construct the SWM/E&S controls. This has compromised the original design and safety in some cases. As stated previously, constructability issues were found on almost every project. In SHA's current process the constructability review is completed at the final design stage; however, this does not allow enough time for changes to be made since advertisement of the project shortly follows final design.

Recommendation: SHA's should incorporate an earlier constructability review at the semi final design stage. Also, a minimum limit of disturbance should be set to ensure that any design changes after semi final take into account the space needed for construction access, equipment, etc. Also, prior to advertisement of a project a separate erosion and sediment control constructability review should take place, which would focus on *when* the controls need to be in place. Staff from Highway Hydraulics Division, District Construction, and Regional Construction Engineer should hold this E&S constructability review meeting.

Additional recommendations:

Based on best practices observed and on feedback received by the Team and the construction staff, an additional list of recommendations has been developed. This list is intended to supplement the above major recommendations.

- No signatures were found on the QA inspection reports, which would imply receipt of the report. ***Recommendation:*** PE should sign QA reports to show that the reports were received and read.
- The Project Engineer did not stamp the E&S Control Plans and the plans did not have any signature from SHA or MDE. ***Recommendation:*** SHA and MDE need to stamp and date the plans and all revisions made to it. This will help eliminate the confusion about the updated plan submittal.
- On the MD 468 project, the utility work was included under the same wetland permit as the roadway work. The utility company clear-cut approximately 22,000 sq ft of forested wetland, which was a violation of the wetland permit. ***Recommendation:*** If utility work is included under the wetland permit for roadwork, than an Environmental Monitor should be used to inspect the work in the field. The E.M. does not have to be independent; it could be staff members from HHD, OOC, EPD.
- ***Recommendation:*** SHA should provide additional training for inspectors above the required training.
- ***Recommendation:*** Signs delineating wetland areas should be posted in Spanish as well as English if there is a Hispanic workforce.
- ***Recommendation:*** All permits, including wetland permits, need to be posted outside of the construction field office with the other permits for public review.
- ***Recommendation:*** The SHA E&S Inspector should document the repairs with dates the repairs were performed by the Contractor on the daily reports.

V. Conclusion

The purpose of this process review was to evaluate the quality of the Maryland State Highway Administration's (SHA) process for ensuring that erosion and sediment controls are designed, constructed, and maintained in accordance with the established standards and specifications. It should be noted that this review focused on SHA's *existing* process with the understanding that SHA's Erosion and Sediment Control Program is undergoing major changes in an attempt to improve the overall program. The recommendations made in this report were based on the issues that were observed on each project reviewed and therefore, should be considered to supplement the new initiatives.

Although each project had issues specific to the site conditions, many observations were similar for each review. The major recommendations as outlined above were made in an attempt to deal with those issues that were found common among the projects reviewed or were noted as more widespread by the process review team and/or by the project field staff. If the recommendations are found acceptable, FHWA and SHA will work together to develop strategies to implement the recommendations outlined in this report.

APPENDIX

Environmental Permitting Process Review Work Plan

Purpose of Review:

To evaluate the quality of the Maryland State Highway Administration's (SHA) process for ensuring that erosion and sediment controls are designed, constructed, and maintained in accordance with the established standards and specifications.

Objectives:

- ❑ To evaluate SHA's current process and determine the need for improvement.
- ❑ To investigate compliance with erosion and sediment control plans on several conventional and design build projects currently in construction.
- ❑ To showcase best practices currently in place
- ❑ To establish a baseline for future comparison with new initiatives not yet in place.

Resources:

- ❑ Quality Assurance Inspection Reports
- ❑ MDE Inspector Reports
- ❑ Permits/Plans/Modifications
- ❑ FHWA Erosion and Sediment Control Regulations (Title 23)
- ❑ SHA Construction Directives
- ❑ Other necessary files
- ❑ Project plans, if available.
- ❑ Interviews/Discussions with Construction Engineer/Project Engineer, Environmental Monitor, Contractor, QA Inspectors, MDE Inspectors, etc., if available.
- ❑ Field reviews

Procedures:

- ❑ Develop a summary of current process for ensuring erosion and sediment control plan compliance
- ❑ Develop a list of construction projects to be reviewed
- ❑ Research and review files to determine the history and causes of compliance/non-compliance for the construction projects being reviewed
- ❑ Complete field reviews to verify that the necessary controls are in place and to informally interview construction/contractor staff.
- ❑ Evaluate the data
- ❑ Make recommendations.
- ❑ Present findings to Senior Management from SHA and FHWA.
- ❑ Finalize a report on observations.